CLAIMS

1. A method for operating an access point in a MIMO wireless communication system, said method comprising:

5   sending a first packet to a first subscriber unit via a first spatial subchannel; and

sending a second packet to a second subscriber unit via a second spatial subchannel, said first spatial subchannel and said second spatial subchannel occupying the same bandwidth;

wherein said second packet has greater data length than said first packet; and

10   wherein sending said first packet and sending said second packet begin and end substantially simultaneously.

2.   The method of claim 1 further comprising:

receiving acknowledgements of said first packet and said second packet after

15 completion of transmission of said first packet and said second packet.

3.   The method of claim 2 wherein said first packet is padded so that it will end simultaneously with said second packet.

4.   A method for operating an access point in a MIMO wireless communication system, said method comprising:

for a plurality of subscriber units of said access point, identifying ranges of said

5   subscriber units from said access point;

assigning a first group of said subscriber units to transmit simultaneously during a first upstream transmission slot; and

assigning a second group of said subscriber units to transmit simultaneously during a second upstream transmission slot; and

10   wherein subscriber units of said first group are chosen to have substantially similar ranges to one another and subscriber units of said second group are chosen to have substantially similar ranges to one another.

5.   The method of claim 4 further comprising:

15   transmitting a beacon message identifying a time period for contention-free transmission between said access point and said subscriber units of said first and second groups.

6.   The method of claim 5 further comprising transmitting said beacon

20   message in a contention free period as defined by IEEE 802.11.

7.   A method for operating an access point in a MIMO communication
system, said method comprising:

5   receiving a first packet from a first subscriber unit within a first spatial
subchannel wherein a second packet has commenced transmission substantially
simultaneously with said first packet, said second packet being transmitted within a
second spatial subchannel sharing bandwidth with said first spatial subchannel, wherein
said second packet is longer than said first packet; and

10   transmitting an acknowledgement of said first packet to said first subscriber unit
only after completing reception of said second packet.

8.   The method of claim 7 wherein said acknowledgement is formatted in
accordance with IEEE 802.11.

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9.   A method for operating a subscriber unit in a MIMO communication system, said method comprising:

receiving a first packet from an access point in a first spatial subchannel;

receiving a second packet from said access point simultaneously in a second spatial subchannel that shares bandwidth with said first spatial subchannel; and

decoding only said first packet and not said second packet.

10.   The method of claim 9 wherein said first packet is formatted in accordance with IEEE 802.11.

11.   A method of operating a subscriber unit in a MIMO communication system, said method comprising:

transmitting an OFDM signal via a first spatial subchannel;

transmitting first channel training information on said OFDM signal in a first channel training period; and

during a second channel training period, quieting said OFDM signal to allow transmission of second channel training information by another subscriber unit.

12. The method of claim 11 wherein said first channel training information is specified by the IEEE 802.11a standard.

5   13. The method of claim 11 further comprising:

transmitting start of packet information on said OFDM signal prior to said first channel training period.

14. The method of claim 13 further comprising:

10   quieting said OFDM signal to allow transmission of start of packet information by said another subscriber unit.

15. The method of claim 11 further comprising:

quieting said OFDM signal to allow transmission of start of packet information by 15   said another subscriber unit.

16. In a wireless communication network, a method for operating an SDMA-capable subscriber unit, said method comprising:

during a contention period, requesting an access point for permission to switch

between an SDMA mode and a non-SDMA mode; and

upon receiving permission, switching between said SDMA mode and said non-

5   SDMA mode.

17.   The method of claim 16 wherein requesting comprises transmitting an

802.11 reassociation request or 802.11 association request having a supplemental SDMA

status information element.

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18.   The method of claim 16 further comprising:

during a non-contention period:

communicating data with said access point in a SDMA subperiod if said

subscriber unit is in SDMA mode; and

15   communicating data with said access point in a non-SDMA subperiod if said

subscriber unit is in non-SDMA mode.

19.   In a wireless communication system having subscriber units operating in a

SDMA mode and subscriber units operating in a non-SDMA mode, a method for

operating an access point, said method comprising:

5   maintaining a list of subscriber units operating in an SDMA mode and subscriber

units operating in a non-SDMA mode; and

within a designated contention free period, polling SDMA-mode subscriber units

and non-SDMA-mode subscriber units for transmissions in corresponding non-

overlapping subperiods of said contention free period.

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20.   The method of claim 19 further comprising:

during a contention period, receiving a request from a selected subscriber unit

desiring to switch between SDMA mode and non-SDMA node.

15   21.   The method of claim 20 wherein said request comprises an 802.11

reassociation request or association request having a supplemental SDMA status

information element.

22. Apparatus for operating an access point in a MIMO wireless communication system, said apparatus comprising:

a first transmitter block that sends a first packet to a first subscriber unit via a first

5   spatial subchannel; and

a second transmitter block that sends a second packet to a second subscriber unit via a second spatial subchannel, said first spatial subchannel and said second spatial subchannel occupying the same bandwidth;

wherein said second packet has greater data length than said first packet; and

10   wherein sending said first packet and sending said second packet begin and end substantially simultaneously.

23.   The apparatus of claim 22 further comprising:

a receiver system that receives acknowledgements of said first packet and said

15   second packet after completion of transmission of said first packet and said second packet.

24.   The apparatus of claim 22 wherein said first packet is padded so that it will end simultaneously with said second packet.

25.   Apparatus for operating an access point in a MIMO wireless

communication system, said apparatus comprising:

5   a MAC layer processor that, for a plurality of subscriber units of said access point,

identifies ranges of said subscriber units from said access point, assigns a first group of

said subscriber units to transmit simultaneously during a first upstream transmission slot,

and assigns a second group of said subscriber units to transmit simultaneously during a

second upstream transmission slot; and

10   wherein subscriber units of said first group are chosen to have substantially

similar ranges to one another and subscriber units of said second group are chosen to

have substantially similar ranges to one another.

26.   The apparatus of claim 25 wherein said MAC layer processor further

15 transmits a beacon message identifying a time period for contention-free transmission

between said access point and said subscriber units of said first and second groups.

27.   The apparatus of claim 26 wherein said beacon message is transmitted in a

contention free period as defined by IEEE 802.11.

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28. Apparatus for operating an access point in a MIMO communication system, said apparatus comprising:

a receiver system that receives a first packet from a first subscriber unit within a
5   first spatial subchannel wherein a second packet has commenced transmission substantially simultaneously with said first packet, said second packet being transmitted within a second spatial subchannel sharing bandwidth with said first spatial subchannel, wherein said second packet is longer than said first packet; and

a transmitter system that transmits an acknowledgement of said first packet to said
10   first subscriber unit only after completing reception of said second packet.

29. The apparatus of claim 28 wherein said acknowledgement is formatted in accordance with IEEE 802.11.

15   30. Apparatus for operating a subscriber unit in a MIMO communication system, said apparatus comprising:

a receiver block that receives a first packet from an access point in a first spatial subchannel and receives a second packet from said access point simultaneously in a second spatial subchannel that shares bandwidth with said first spatial subchannel; and

20   a decoder block that decodes only said first packet and not said second packet.

31. The apparatus of claim 30 wherein said first packet is formatted in accordance with IEEE 802.11.

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32. Apparatus for operating a subscriber unit in a MIMO communication system, said apparatus comprising:

a transmitter system that transmits an OFDM signal via a first spatial subchannel;

a channel training information insertion block that inserts first channel training

10 information on said OFDM signal in a first channel training period; and

wherein said transmitter system, during a second channel training period, quiets said OFDM signal to allow transmission of second channel training information by another subscriber unit.

15 33. The apparatus of claim 32 wherein said first channel training information is specified by the IEEE 802.11a standard.

34. The apparatus of claim 32 wherein said transmitter block transmits start of packet information on said OFDM signal prior to said first channel training period.

35.   The apparatus of claim 34 wherein said transmitter block quiets said

OFDM signal to allow transmission of start of packet information by said another

5   subscriber unit.

36.   In a wireless communication network, apparatus for operating an SDMA-

capable subscriber unit, said apparatus comprising:

a MAC layer processor that, during a contention period, requests an access point

10   for permission to switch between an SDMA mode and a non-SDMA mode and upon

receiving permission, switches between said SDMA mode and said non-SDMA mode.

37.   The apparatus of claim 36 wherein said MAC layer processor requests by

transmitting an 802.11 reassociation request or 802.11 association request having a

15   supplemental SDMA status information element.

38.   The apparatus of claim 36 wherein said MAC layer processor, during a

non-contention period, communicates data with said access point in a SDMA subperiod if

said subscriber unit is in SDMA mode and communicates data with said access point in a

20   non-SDMA subperiod if said subscriber unit is in non-SDMA mode.

39.   In a wireless communication system having subscriber units operating in a SDMA mode and subscriber units operating in a non-SDMA mode, apparatus for operating an access point, said apparatus comprising:

an SDMA-capable physical layer transceiver that maintains a list of subscriber units operating in an SDMA mode and subscriber units operating in a non-SDMA mode; and within a designated contention free period; and

a MAC layer processor that polls SDMA-mode subscriber units and non-SDMA-mode subscriber units for transmissions in corresponding non-overlapping subperiods of said contention free period.

40.   The apparatus of claim 39 wherein said MAC layer processor, during a contention period, receives a request from a selected subscriber unit desiring to switch between SDMA mode and non-SDMA node.

41.   The apparatus of claim 40 wherein said request comprises an 802.11 reassociation request or 802.11 association request having a supplemental SDMA status information element.